

III. REMARKS

A. Introduction

This invention generally relates to multi-polarization active array transmit antennas. In particular, the application describes a chip comprising phase shifters that control the scan angle, linear polarization, and circular polarization of an RF signal.

B. Amendments

Claims 1, 4, 10, 22, and 30 have been amended.

Claims 34-38 have been added.

Claim 33 has been cancelled.

In sum, claims 1-10, 22-32, and 34-38 are pending.

Independent claims 1, 22, and 30 have been amended to recite at least one attenuator to control the linear polarization of an RF signal. This feature is described in the specification on p. 10, line 18 - p. 11, line 3:

The combination of amplifiers 3031, 3032 and 3033, attenuators 304, phase shifters 305, 306, 307, 308, 3091 and 310, and the Lange coupler 312 converts the input signal RF_i to linearly polarized signals RFO and RFL. The scan angle and the linear polarization angle of the RFO and RFL output signals from the Lange coupler 312 are determined by the various control signals generated by the SPC 301, which are used to control the phase shifters and attenuators listed above.

The at least one attenuator 304 accordingly work in combination with the series of phase shifters to control the linear polarization of the RF signal. It is through the use of an attenuator that the invention enables more precisely controlling the linear polarization angle of an RF signal. As described in the specification, the linear polarization angle could be controlled to any desired angle in the range of about 0° to 90°.

New claim 37 recites a Wilkinson divider. Support for this claim can be found in the specification on page 9, lines 7-10: “In an embodiment of the present invention, divider 302 is designed in the configuration of a Wilkinson divider using a strip-line formed on an MMIC. The design and implementation of such a Wilkinson divider is well known to those of ordinary skill in the art.”

C. Rejection of Claims 10-11 Under 35 U.S.C. § 112 Second Paragraph As Being Indefinite

The Examiner rejects claim 10 for reciting a chip that is “using a multifunction self-aligned gate process” when a supporting reference (Andricos) for this element discloses a chip “manufactured by” such a process. The Examiner notes that “manufactured by” and “using” are two different concepts. Claim 10 has been amended to recite a chip “manufactured using a multifunction self-aligned gate process,” which is consistent with the way the term “multifunction self-aligned gate process” is used by skilled artisans.

Applicant respectfully submits that amended claim 10 overcomes the Examiner’s rejection and accordingly requests that the rejection be withdrawn.

D. Rejection of Claims 1, 2, 6-9, 11, 22-26, 28-31, and 33 Under 35 U.S.C. § 102(b) as being anticipated by Fassett

The Examiner rejected claims 1, 2, 6-9, 11, 22-26, 28-31, and 33 Under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,088,970 to Fassett et. al. (“Fassett”). It is well established that in order to anticipate a claim, a reference must disclose every element of the claim either expressly or inherently.

Amended claim 1 recites “at least one attenuator to control the...linear polarization of an RF signal.” Independent claims 22 and 30 also recite at least one attenuator to control the linear polarization of an RF signal. (Claim 33 has been cancelled.)

Fassett discloses a system for controlling the polarization sense and phase delay of an RF signal. However, Fassett does not teach an attenuator. Thus, Fassett fails to teach at least one element of independent claims 1, 22, and 30. It follows that Fassett fails to teach the elements of dependent claims 2, 6-9, 11, 23-26, 28, 29, and 31, which depend from claims 1, 22, and 30.

Thus, Applicant respectfully submits that the rejection of claims 1, 2, 6-9, 11, 22-26, and 28-31 is improper and should be withdrawn.

E. Rejection of Claims 3-5, 10, 27, and 32 Under 35 U.S.C. § 103(a) as unpatentable over Fassett

The Examiner rejected claims 3-5, 10, 27, and 32 Under 35 U.S.C. § 103(a) as unpatentable over Fassett.

As amended, claims 1, 22, and 30 recite at least one attenuator to control the linear polarization of an RF signal. Claims 3-5, 10, 27, and 32 depend from these claims and therefore incorporate this feature. As noted above in Section D above, Fassett does not teach this feature because it does not teach an attenuator. Instead, the Fassett system uses only phase shifters, switches, and other basic components to achieve control of only four linear polarization angles: vertical (90°), horizontal (0°), and two diagonals (+/- 45°). The novel circuit design in the present invention and its use of an attenuator enables more robust control of linear polarization. Similarly, Fassett fails to suggest using an attenuator

to control linear polarization because it does not suggest an attenuator. The Examiner has presented no evidence to remedy this deficiency.

Applicant acknowledges Examiner's statement that Fassett does not teach all the features of claims 3-5 and 10, such as a 5.625° phase shifter, an attenuator and amplifiers, and the use of transistor-transistor logic (TTL) to control polarization and scan angle. However, Applicant does not agree that such features, in the context of transmitter chips with linear polarization control as recited in the claims, are either "obvious design characteristics" or "conventional and do not represent any novelty in the art of antenna array control." Accordingly, applicant requests the provision of a supporting reference per MPEP § 2144.03.

Thus, Applicant respectfully submits that the rejection of claims 3-5, 10, 27, and 32 is improper and should be withdrawn.

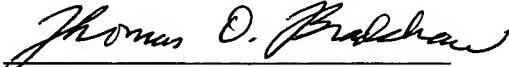
VI. Conclusion

Applicant respectfully submits that the claims as amended are supported by the specification and therefore add no new matter. Applicant further respectfully submits that the application is in condition for allowance and respectfully requests a notice of allowance for the pending claims. Should the Examiner determine that any further action is necessary to place this application in condition for allowance, the Examiner is kindly requested and encouraged to telephone Applicant's undersigned representative at the number listed below.

This response to the Office Action is being filed before the expiration of three (3) months from the date of the Office Action. Therefore, it is believed that no extension fees are required. If any additional fees are deemed necessary, such as for extra claims, Applicant hereby provides authorization to charge such fees against deposit account 50-0206. If any refunds are due, Applicant hereby provides authorization to credit such refunds against the deposit account.

Respectfully submitted,

Date: May 3, 2004



Thomas D. Bradshaw
Reg. No. 51,492

Hunton & Williams LLP
1900 K Street, N.W.
Washington, D.C. 20006-1109
Phone: (202) 955-1500
Fax: (202) 778-2201